

We claim:

1. An isolated human monoclonal antibody that binds to dendritic cells.
- 5 2. The antibody of claim 1, wherein the cells are human cells.
3. The antibody of claim 1, wherein the cells are derived from monocytes or progenitor stem cells.
- 10 4. The antibody of claim 1 which does not bind to non-dendritic cells from human tissues selected from the group consisting of skin, tonsil, liver, breast, spleen, kidney, lymph node, brain, testis, pancreas, heart, small intestine, bone marrow and lung.
- 15 5. The antibody of claim 1 which binds to macrophages.
6. The antibody of any of claims 1 which binds to the human macrophage mannose receptor.
- 20 7. The antibody of claim 1 which binds to human macrophage B11 antigen having an approximate molecular weight of 180 kD as measured by SDS-PAGE and comprising the amino acid sequence shown in SEQ ID NO:7.
8. The antibody of claim 6 which inhibits binding to the mannose receptor.
- 25 9. The antibody of claim 1 which is internalized following binding to dendritic cells.
10. The antibody of claim 1 which binds to human dendritic cell E21 antigen having
- 30 an approximate molecular weight of 36-40 kD as measured by SDS-PAGE.
11. The antibody of any of claims 1 comprising an IgG1 or IgG3 heavy chain.

12. The antibody of claim 11 comprising a kappa light chain.
13. The antibody of claim 1 produced by a hybridoma which includes a B cell
5 obtained from a transgenic non-human animal having a genome comprising a human heavy chain transgene and a human light chain transgene fused to an immortalized cell.
14. The antibody of claim 1 which is an antibody fragment or a single chain
10 antibody.
15. An isolated human monoclonal antibody that binds to dendritic cells, wherein the antibody has at least one of the characteristics selected from the group consisting of:
- 15 a) the ability to bind to the mannose receptor present on human dendritic cells with a binding equilibrium association constant (K_a) of at least about 10^7 M^{-1} ;
- b) the ability to opsonize human dendritic cells;
- c) the ability to be internalized after binding to human dendritic cells; and
20 d) the ability to block binding to the mannose receptor on human dendritic cells.
16. An isolated human monoclonal antibody encoded by human IgG heavy chain and human kappa light chain nucleic acids comprising nucleotide sequences in
25 their variable regions as set forth in SEQ ID NO:1 and SEQ ID NO:3, respectively, and conservative sequence modifications thereof.
17. An isolated human monoclonal antibody having IgG heavy chain and kappa light chain variable regions which comprise the amino acid sequences shown in SEQ
30 ID NO:2 and SEQ ID NO:4, respectively, and conservative sequence modifications thereof.

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18. A hybridoma comprising a B cell obtained from a transgenic non-human animal having a genome comprising a human heavy chain transgene and a light chain transgene fused to an immortalized cell, wherein the hybridoma produces a detectable amount of a human monoclonal antibody that binds to dendritic cells.
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19. The hybridoma of claim 18, wherein the antibody binds to the macrophage mannose receptor.
20. The hybridoma of claim 18, wherein the antibody comprises IgG heavy chain and kappa light chain variable regions which comprise the amino acid sequences shown in SEQ ID NO:2 and SEQ ID NO:4, respectively, and conservative sequence modifications thereof.
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21. A transgenic non-human animal which expresses a human monoclonal antibody that binds to human dendritic cells, wherein the transgenic non-human animal has a genome comprising a human heavy chain transgene and a human light chain transgene.
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22. A method of producing a human monoclonal antibody that binds to human dendritic cells, comprising:
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- immunizing a transgenic non-human animal having a genome comprising a human heavy chain transgene and a human light chain transgene with human dendritic cells or a surface component thereof, such that antibodies are produced by B cells of the animal;
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- isolating B cells of the animal; and
- fusing the B cells with myeloma cells to form immortal, hybridoma cells that secrete human monoclonal antibodies which bind to human dendritic cells.
23. A bispecific molecule comprising a first binding specificity for a human dendritic cell and a second binding specificity for a target antigen, wherein the first binding specificity is a human monoclonal antibody.
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24. The bispecific molecule of claim 23, wherein the antigen comprises a component of a pathogen.
25. The bispecific molecule of claim 23, wherein the antigen comprises a tumor antigen.
26. The bispecific molecule of claim 23, wherein the antibody is an antibody fragment or a single chain antibody.
27. A molecular conjugate comprising a human monoclonal antibody that binds to human dendritic cells linked to an antigen.
28. The molecular conjugate of claim 27, wherein the antigen comprises a component of a pathogen.
29. The molecular conjugate of claim 27, wherein the antigen comprises a tumor antigen or an autoantigen.
30. The molecular conjugate of claim 27, wherein the antibody portion of the conjugate comprises an antibody fragment or a single chain antibody.
31. The molecular conjugate of claim 27, wherein the antibody comprises heavy chain and light chain variable regions which comprise the amino acid sequences shown in SEQ ID NO:2 and SEQ ID NO:4, respectively, and conservative sequence modifications thereof.
32. The molecular conjugate of claim 27, wherein the antigen is a melanoma associated antigen selected from the group consisting of Gp100 and Pmel-17.
33. A molecular conjugate comprising a human monoclonal antibody that binds to human dendritic cells linked to Pmel-17 antigen.

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34. The molecular conjugate of claim 33, wherein the antibody comprises heavy chain and light chain variable regions which comprise the amino acid sequences shown in SEQ ID NO:2 and SEQ ID NO:4, respectively, and conservative sequence modifications thereof.
- 5 35. The molecular conjugate of claim 33, encoded by the nucleotide sequence shown in SEQ ID NO:8.
36. A composition comprising an isolated human monoclonal antibody which binds
10 to human dendritic cells and a pharmaceutically acceptable carrier.
37. A composition comprising a combination of two or more antibodies according to claim 36, wherein each of said antibodies binds to a distinct epitope on a dendritic cell.
- 15 38. A composition comprising a molecular conjugate according to claim 27 and a pharmaceutically acceptable carrier.
39. The composition of claim 38 further comprising an adjuvant.
- 20 40. A nucleic acid comprising a nucleotide sequence encoding a variable region of a human monoclonal antibody that binds to dendritic cells.
41. The nucleic acid of claim 40 encoding the amino acid sequence shown in SEQ
25 ID NO:2 or SEQ ID NO:4.
42. A method for targeting an antigen to a dendritic cell in a subject comprising administering to the subject a composition according to claim 38.
- 30 43. A method of inducing or enhancing an immune response against an antigen in a subject comprising administering to the subject a composition according to claim 38.

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